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Space Age Patents

Background: Hastily-drawn provisions of the National Space Act have caused a storm of protest from American industry, giving rise to fears that companies performing R&D for National Aeronautics and Space Administration would surrender commercial patent privileges and competitive advantages. NASA proposal for more leeway is now undergoing Congressional scrutiny.

Tentative Approval: House Space Patent Subcommittee now agrees provisions have "tended to complicate and retard" U.S. space progress. With few changes, they endorse Administration proposals permitting NASA more discretion in permitting contractors to retain title to inventions.

Effects of Current Law: NASA cites several examples of difficulties or delays. These include General Electric Co. and its cyrogenic gyroscope; Westinghouse and its arc discharge technique for Mach 15 wind tunnels; Electric Storage Battery Co. and power supplies; Narmco Industries and subcontract work for it on plastic and ceramic space materials; Associated Piping, San Diego, and its novel process for welding tungsten containing alloys; Leesona Corp, owner of patents already licensed for a carbon dioxide analyzer and others, including the Garrett Corp and Statham Instruments.

"The Subcommittee cannot ignore," Congress is advised, "the candid and near-unanimous sense of disapproval which is being expressed by private enterprise."

NASA Proposal: Currently, any invention made under contract with NASA becomes the Government's exclusive property, although this right can be waived. Under the new proposal NASA would have more leeway; would in fact be required to protect both the public interest and the equities of the contractor. If a contract provided for title rights in the Government, those rights could be waived. But the new clause would still permit complete Government use of an invention with no payment of royalties -- and would permit the invented article to be produced by any contractor NASA chooses.

Outlook: NASA is currently attempting to assure contractors that it will take a "soft" policy under existing law. It is not unlikely that Congress will delay final action on revisions until next year -- or later if a new administration takes over. Delay may also be caused if Congress decides to overhaul and standardize the patent regulations of all Government Agencies.

(Patent regulations of other major Government Agencies will be reviewed in Washington SCIENCE TRENDS next week)

* Army Aircraft Requirements

Here is a new official summary of Army Aircraft requirements for strategic airlift and tactical assault purposes:

/ Strategic Aircraft: The Army requires a strategic aircraft capable of carrying a payload of 30 tons and with an operating radius of 1,500 nautical miles or a critical leg of 3,500 nautical miles. It should possess a takeoff and landing capability with approximately 1,000 feet of ground roll on level terrain with minimum preparation. It should be capable of night and instrument operations and possess facilities for air delivery and air landing of troops, supplies and equipment. In addition, facilities for aeromedical evacuations are required.

The aircraft should be capable of carrying 225 combat-equipped troops, supplies and equipment. Capability of fore and aft loading is most desirable, and if this cannot be accomplished, aft loading is mandatory. The cargo compartment should accommodate the latest types of Army equipment.

/ Tactical Assault: The Army requires a medium transport capable of carrying a 10-ton payload and with an operating radius of 1,000 nautical miles. This aircraft should be able to take off and land with not more than 500 feet of ground roll on level, unprepared ground under standard conditions. It should be capable of night and instrument operations and should have provision for delivery of troops, supplies and equipment by parachute, heavy drop or air-landed means. Aeromedical evacuation facilities should also be included. This aircraft will be employed as a basic means of transport of troops, supplies, and equipment in intratheater assault and logistical operations.

* Space Observatory

National Science Foundation is funding very long range conceptual, and preliminary design studies, on a moderately large space telescope with apertures of the order of 50 inches. Work is being done by the Kitt Peak National Observatory which has been established southwest of Tucson, Arizona. Goal is an instrument which would be useful for a wide variety of research problems involving spectroscopy, direct photography and photometry in the ultraviolet region. Optical resolution would be as close as possible to the theoretical limit determined by the aperture.

No time schedule for completion or launching has been set but it is hoped that the telescope might be placed in a 24-hour "stationary" orbit, and remain operable for at least a year and perhaps for 10 years. A somewhat related project administered by the Carnegie Institution of Washington for the Foundation, calls for the development of simple, inexpensive efficient light amplifiers for astronomical purposes. The foundation believes that success appears likely, and that such devices could effectively multiply the aperture of any existing large telescope by a factor between five and ten.

* Jet Fuel Contamination

Navy is studying possible remedies for the problem of contamination of jet fuel by bacteria and fungi. These organisms, it has been found, not only clog filters and strainers but may also act as stabilizers of what one researcher terms "rather bizarre emulsions" of water and fuel.

Studies show that the organisms thrive on water in fuel-handling systems, and even on the fuel itself. Elimination of all water from such systems is thought to be impractical, although work on filters and water separators is deemed important.

Serious attention is being given, therefore, to a microbial inhibitor for the fuel. Customary additives are said to be unsatisfactory but at least two gasoline additives, which are believed to be compatible with jet fuel at practicable concentrations, show promise. Suggestions that a water-soluble, fuel-insoluble inhibitor be employed are under consideration -- though this might not be feasible if unusual amounts of inhibitor get into the fuel through emulsification.

(R&D Reported to U.S. Navy by John M. Leonard, U.S. Naval Research Laboratory, Washington 25, D.C.)

* Georgia Nuclear Laboratories

U.S. Air Force now wants to abandon its Georgia Nuclear Laboratories after spending some $15-20 million for near-completion. Plant, known as AFP No. 67, was designed to study the effects of radiation upon materials, components and subsystems of nuclear propelled vehicles.

Lockheed Corp. spent some $500,000 for land and deeded it to the Air Force, which then put in about $15 million in facilities and equipment. Another $5 million was spent in operating contracts.

Information gathered by the House Armed Services Committee, headed by a powerful Georgian, Rep. Carl Vinson, indicates that Air Force Nuclear Project officers "feel themselves bound by instructions to stop programs of this sort, pending further developments in powerplants."

Lockheed has proposed a 2-year program of component testing on a $4-million a year basis for such projects as Pluto, the nuclear ramjet; Rover, the Nuclear Rocket; SLAM, supersonic low-altitude missiles; SNAP, satellite nuclear auxiliary power and others. It is also suggested that, because support facilities already exist, a pulsed reactor for studies in the missile and space field as well as certain weapons effects could be built at the Georgia Nuclear Laboratories for about $200,000 compared with $500,000 to $1,500,000 elsewhere.

* Atomic Energy Research

Rep. Melvin Price (D.) Ill., opens hearings in Washington March 22-25 on Frontiers in Atomic Energy Research. Tentative plans call for sessions on Plowshare, the program of peaceful uses of nuclear explosives; Sherwood, the program for controlled thermonuclear reactions; Space Propulsion and Power; Advanced Reactor Applications, and Direct Energy Conversion and Solar Energy Systems.

* High Speed Photography Congress

Army, Navy and Air Force are co-sponsors of an International Congress on High-Speed Photography to be held in Washington, D.C. October 16-22.

(For details write Mr. Max Beard, Chairman, Naval Ordnance Laboratory, 10703 East Nolcrest Drive, Silver Spring, Md.)

* Solar Energy Information Center

Army has formed a Solar Energy Information Center under the direction of the Office of the Chief of Research and Development. The Center is charged with the responsibility of collecting, collating, analyzing and disseminating, on a working level basis, technical information on projects, programs and research results of civilian and military origin. This phase of the activity is assigned to the Army Signal Corps, and is to be coordinated with the Army Corps of Engineers, which is responsible for research and development of solar energy conversion systems for the generation of "utility-type" electrical power.

* Antitank Evaluation

Army has been conducting evaluation tests of at least four foreign antitank missiles; the French SS-10 and SS-11; limited tests of the British Vigilant and joint evaluation with the Marine Corps of the West German Cobra.

Major advantages over the gun and recoilless-type antitank weapons of the U.S. Army are described by the Army as:

- Lighter system weight
- Greater warhead lethality
- Greater effective range
- Better hit probability at medium and long range, particularly at moving targets.

General disadvantages are viewed as:

- Higher cost, particularly in training ammunition
- Less desirable minimum ranges
- Training and operations complicated by increased sophistication.

* Radioisotope Workshop

Atomic Energy Commission, and a number of local organizations, will sponsor a two-day meeting on industrial applications of radioisotopes March 30-31, 1960. Industrial and government spokesmen plan to discuss programs and applications in a number of related fields.

(Management and technical personnel and educators wishing to attend may obtain additional information from Mr. Roger W. Boyd, United Illuminating Co., 80 Temple St., New Haven 6, Conn.)

Research Checklist

( ) Microsecond Shutter Camera: A single-stage image convertor is used in a camera developed for the Atomic Energy Commission's studies of controlled nuclear fusion experiments. This has an advantage in high-speed photography, which is frequently hampered by lack of brightness of the image due to the short time in which the film must be exposed. The electronic camera is said to be simple to operate, relatively small and highly mobile. It can also operate in an intense magnetic field.

(Technical Report available. 49 pages. $1.50. Write OTS, U.S. Department of Commerce, Washington 25, D.C. for ORNL-2804)

( ) Foamed Plastic Space Structures: Engineers of Goodyear Aircraft Corp. have proposed the use of coated fabric, consisting of either organic or metal fibers, for the construction of expendable orbital space stations. The structures would be formed or shaped by internal air or gas pressure. For added permanence foamed-in-place plastics would be used in areas between outer and inner walls. Such a building form, it is asserted, would weigh much less than conventional structures, but would afford adequate load-carrying capacity.

( ) Expansion Turbine Studies: Various possible uses for expansion engines in hydrogen liquefaction plants have been studied at the National Bureau of Standards. It has been concluded that modern materials and designs should make the use of expansion turbine engines attractive for outputs of 5,000 liters per hour or more.

(Details available. Single copies free. Write National Bureau of Standards, Office of Technical Information, Washington 25, D.C. for Reprint, Paper 64C1-21)

( ) Radioisotope Conference: Atomic Energy Commission will coordinate U.S. technical papers to be presented at an international conference on "The Use of Radioisotopes in the Physical Sciences and Industry" in Copenhagen, Denmark on Sept. 6-17, 1960.

(For submission of abstracts and further information, write Office of Special Projects, Atomic Energy Commission, Washington 25, D.C.)

( ) Carbon Resistors: National Aeronautics and Space Administration has made progress in the use of a carbon composition resistor to measure temperatures at extremely low liquid hydrogen levels. Thermal sensitivity was found to be high, small size contributed to simplified test mounting, and relatively low resistance resulted in satisfactory impedance for instrumentation.

(Report available. Single copies free. Write NASA, ATTN: CODE BID, 1520 H Street, N.W., Washington 25, D.C. for NASA TN D-264)

Publication Checklist

( ) Compressed Air Systems, a listing of reference material pertaining to safety considerations in compressed air systems. 7 pages. Single copies free. (Write Safety and Fire Protection Branch, U.S. Atomic Energy Commission, Washington 25, D.C. for Accident and Fire Prevention Issue No. 106)

( ) ASTIA Automation, a technical report on the installation and use of a Univac Solid State Computer for the automation of document handling systems by the Armed Services Technical Information Agency including a thesaurus of 9,000 "Descriptors" developed out of 70,000 subject headings. An interim single-word heading or "Uniterm" system was found to lack definition. 56 pages. $1.25. (Write OTS, U.S. Department of Commerce, Washington 25, D.C., for PB 161-306)

( ) SPERT-II. A technical fact sheet on the SPERT-II (Special Power Excursion Test Reactor), one of a series built or under construction by the AEC. Copies free. (Write Assistant to the Manager for Information, U.S. Atomic Energy Commission, Idaho Operations Office, P.O. Box 1221, Idaho Falls, Idaho)

( ) Navy Contract Law, a new revised edition of a basic handbook designed to aid contractors with the Federal Government. Many contractors, the volume points out, make unnecessary and costly mistakes because of ignorance of the applicable rules. Read it and weep. 1,015 pages. $8. (Write Superintendent of Documents, Government Printing Office, Washington 24, D.C. for Pub No. D 201.5:C 76)

( ) High-Flux Irradiation, a survey of industry's requirements for high-flux irradiation space in test reactors for the next six years, and related information. Copies free. (Write Division of Reactor Development, Atomic Energy Commission, Washington 25, D.C. for Survey of Industrial Requirements for General Testing Reactors, 1960-1965)

( ) NASA Annual Report, the yearly summary of past programs, and a glimpse of future projects, of the National Aeronautics and Space Administration and related projects of other agencies of the Federal Government. 141 pages. Single copies free. (Write Information Office, National Aeronautics and Space Administration, 1520 H Street, N.W., Washington 25, D.C. for NASA Annual Report to Congress)

( ) Scientific Research in Great Britain, a thorough study and analysis prepared by the Library of Congress on all phases of scientific and industrial research in the United Kingdom with the emphasis on basic research and atomic energy. 285 pages. Single copies free. (Write Joint Committee on Atomic Energy F-88, The Capitol, Washington 25, D.C.)

( ) NASA Contracts, hearings and statements relating to controversial contracts on large-thrust rocket engines and the Project Mercury Man-in-Space capsule, including new material on reasons for selection or rejection of bids. 136 pages. Single copies free. (Write Committee on Science and Astronautics, George Washington Inn, Washington 25 D.C., for Hearings No. I, 86th Congress, Second Session)